

Studies on Schismatoglottideae (Araceae) of Borneo III: *Schismatoglottis confinis*, a Putative Sister Taxon to *Schismatoglottis bauensis* from Sarawak, Malaysian Borneo

WONG SIN YENG¹ AND PETER C. BOYCE²

¹Faculty of Resource Science and Technology, Universiti Malaysia Sarawak,
94300 Samarahan, Sarawak, Malaysia

²Malesiana Tropicals, Suite 9-04, Tun Jugah Tower,
No. 18, Jalan Tunku Abdul Rahman,
93100 Kuching, Sarawak, Malaysia

Abstract

Schismatoglottis confinis S.Y.Wong & P.C.Boyce is described and illustrated as a new species closely related to *Schismatoglottis bauensis* A.Hay & C.Lee. An expanded description of *S. banensis* is also presented together with a key to separate the two species. Both species are illustrated.

Introduction

Schismatoglottis bauensis A.Hay & C.Lee is a lithophyte in humus and litter pockets on boulders and cliffs of the Bau limestones, Kuching Division (West Sarawak), where it is locally endemic and coexists with *Schismatoglottis nervosa* Ridl., also endemic. *Schismatoglottis bauensis* is placed in the **Multiflora** group sensu Hay & Yuzammi (2000) defined by pleioanthic shoots and the adnate portion of the petiolar sheath short but the remainder extended into long ligular portion. *Schismatoglottis bauensis* is readily distinguished from the rest of the **Multiflora** group by the absence of an appendix, always with pendent leaf laminae and striking pinkish innovations.

While undertaking a survey of the limestones and adjacent sandstones in the Serian (Sri Aman Division) and Padawan (Kuching Division) areas the authors became aware of a taxon related to *S. banensis* present on both these limestones and, curiously, given the high level of limestone-endemism displayed by *Schismatoglottis* in Sarawak, also on the sandstones of Gunung Ampungan, Serian (Southeast Sarawak) (Sri Aman Division). Detailed study of these collections revealed a species that while clearly allied to *S. bauensis*, is separable on a number of key characters

as well as ecologically and geographically. It is herewith described as *Schismatoglottis confinis* S.Y.Wong & P.C.Boyce.

***Schismatoglottis bauensis* A. Hay & C. Lee**

Telopea 9(1) (2000): 84. — **Typus:** Malaysia, Sarawak, Kuching Division, Bau, Gua Peri-peri (Fairy Caves), ca 7 km from Bau, 10 Mar 1994, P.C. Boyce 790 [holo - 2 sheets, K; iso, SAR (n.v.)]. The isotype of *S. bauensis* was not located during a search of SAR. **Plate 1.**

Medium to robust **herbs** to ca 75 cm tall. **Stem** pleioanthic, condensed when young, later more-or-less creeping-ascending, ca 2-2.5 cm thick, bright red internally, internodes to ca 0.5 cm long. **Leaves** to ca 8 together; petiole terete, 30-55 cm long, always tinged reddish towards the base, glabrous, sometimes densely scabrid, drying rust-brown, sheathing only at the extreme base, the sheath extended into a bicarinate narrowly lanceolate free ligular portion to 15-22 cm long, this drying dark brown; laminae ovate, 15-30 cm long x 7-15 cm wide, always pendent, glossy dark green adaxially, abaxially paler and never glaucous, base obtuse and slightly decurrent, never cordate, tip acute, acuminate for up to ca 3 cm; midrib raised abaxially (dry), adaxially flush with the lamina, 1.5-5 mm wide, with 18-26 primary lateral veins on each side, irregularly alternating with interprimary veins, diverging at 60°-70°; secondary venation rather obscure, arising from the midrib and from the bases of the primary veins; tertiary venation not visible. **Inflorescences** 1-4 together, pendant, each subtended by lanceolate prophyll resembling the ligular leaf sheaths; peduncle to 10 cm long, not exceeding the prophyll. **Spathe** 8-13 cm long; lower spathe, obliquely inserted to peduncle, straight, 3.5-5 cm long, green, differentiated from the limb by a weak constriction level with the top of the spadix interstice; limb 5 cm long, green at first, becoming white at anthesis, widely elliptic to oblongo-lanceolate, caducous, with a tubular mucro up to 8 mm long. **Spadix** 6.5-11 cm long, subcylindric; female zone 3-4.5 cm long, $\frac{1}{3}$ of spadix length, adnate to the spathe in the lower $\frac{2}{3}$, widest at side (ca 7 mm wide), narrowest at ventral and dorsal (ca 6 mm), the free part slightly conoid, apically ca 4 mm diam.; pistils numerous and crowded, subcylindric, ca 0.4 mm diam.; stigma sessile, about the diameter to slightly wider than the ovary, button-like, papillate, staining light brown in alcohol; interpistillar staminodes present, less than five, small, ca 4 mm diam., slightly taller than pistils, staminodes or pistillodes (?) confined to a single row along the spathe/spadix adnation, about the height and diameter of the pistils, subcylindric, flat-topped, remaining white in alcohol; sterile interstice ca 6 mm long, somewhat obconoid, white when fresh but staining brown in alcohol, distally 6 mm diam., basally with pistillodes in more-or-



Plate 1. *Schismatoglottis bauensis* A.Hay & C.Lee. A. Overall habitat; B. Leaf laminae with obtuse to slightly decurrent base; C. Emerging pinkish innovations; D. Inflorescence with limb abscised; E. Limb gaping at anthesis; F. Female anthesis.

less two rows and distally with staminodes, pistillodes of equal size and height to pistils, staminodes of interstice crowded, irregularly polygonal, 0.5-1 mm diam., flat-topped; male zone 4-6 cm long, $\frac{1}{2}$ of spadix length, finger-like, lower zone remaining white in alcohol, upper zone stained brown in alcohol, basally isodiametric with top of interstice, tapering to a blunt point in the upper half; stamens truncate, flat-topped, 0.5-0.7 mm across, 1.2-1.6 mm long, somewhat irregularly rectangular with the connective wide, elevated; pore punctiform, on the narrower edges of the stamen, ca 0.15 mm diam. with fine tissue protruding from the inner most surface; appendix absent. **Fruiting spathe** narrowly urceolate, 4 cm long, immature, ripening green and splitting into irregular strips. **Fruits** white-green.

Other specimens seen: SARAWAK: Kuching Division: Bau, Jambusan, Bukit Batu, 6 Apr 2004, P.C.Boyce & Jeland ak Kisai AR-20 (SAR + spirit); Bau, Krokong, Gua Peri-peri, $01^{\circ} 22' 51.9''$; $110^{\circ} 07' 09.3''$, 29 Oct 2003, P.C.Boyce & Jeland ak Kisai AR-146.1 (SAR); Bau, Kampung Bogag, Gunung Tibugai, $01^{\circ} 21' 31.1''$; $110^{\circ} 03' 48.7''$, 6 Jan 2005, P.C.Boyce & Jeland ak Kisai AR-949 (SAR); Bau, Kampung Duyoh, Sungai Duyoh, $01^{\circ} 20' 45.6''$; $110^{\circ} 02' 36.9''$, 8 Jun 2005, P.C.Boyce & Jeland ak Kisai AR-1205 (SAR); Bau, Krokong, Gua Peri-peri, $01^{\circ} 22' 51.9''$; $110^{\circ} 07' 09.3''$, 15 Nov 2006, P.C.Boyce & S.Y.Wong AR-2053 (SAR spirit only); Bau, Kampung Bogag, Gunung Tibugai, $01^{\circ} 21' 31.1''$; $110^{\circ} 03' 48.7''$, 12 Jan 2005, P.C.Boyce et al. AR-961 (SAR); Bau, Krokong, Kampung Tringgus, $01^{\circ} 15' 40.2''$; $110^{\circ} 05' 35.9''$, 19 Feb 2005, P.C.Boyce et al. AR-997 (SAR); Bau, Segong, Gunung Opar, $01^{\circ} 27' 07.3''$; $110^{\circ} 04' 00.5''$, 9 Nov 2005, P.C.Boyce et al. AR-1503 (SAR + spirit); Bau, Jambusan, 8 Dec 2004, M.Gibernau AR-843 (SAR); Bau, Gunung Noka, 11 Oct 2004, Jeland ak Kisai AR-725 (SAR); Bau, Kampung Jugan, 19 Jun 2004, Jeland ak Kisai & Jipom ak Tisai AR-475 (SAR); Bau, Gunung Poing, 23 Sep 2001, Julia S. et al. SBC 346 (SAR); Bau, Bengoh Range, Logging Road, Pangkalan Tebang, 6 Jul 1996, M.Mohizah, Yahud et al. S. 73891 (SAR); Bau, 1 mile west of Bau, 6 Aug 1961, Dan H. Nicolson 1300 (SAR); Ibid., 6 Aug 1961 Dan H. Nicolson 1303 (SAR).

Distribution: Borneo: Sarawak - endemic, known only from the vicinity of Bau, Kuching Division, West Sarawak.

Habitat: Lithophytic in humus and litter pockets on limestone boulders and cliffs at ca 10-100 m asl.

Notes: In the three inflorescences of *S. bauensis* that the authors investigated

there is a zone of pistillodes at the base of interstice that is followed by staminodes distally. However, the authors are undecided whether the sterile zone at the basal of the spadix insertion is comprised of staminodes or pistillodes. There is an additional character for *S. bauensis*, where the pores of the stamens uniformly appear to have a fine tissue protruding from inner most surface.

***Schismatoglottis confinis* S.Y.Wong & P.C.Boyce, sp. nov.**

Ab S. bauensis foliis subtus glaucis, laminae foliae basi semper decurrenti, veneris laminorum seconadariis abaxialiter prominentis et nervis tertiaris abaxialiter aliquantum tessellatis; poris antherae oblongo ca 0.3 mm diam. ad paginae interiories antherae positis; connectivo planis, inflorescentia mascula cum alcoholis brunneus. – Typus: Malaysia, Sarawak, Samaranan Division: Serian, Pichin, Tubih Durud, Ampang Siribu, 15 Dec 2004, Simon Kutuh ak Paru AR-926 (holo, SAR). Plate 2.

Medium to moderately robust **herbs** to ca 70 cm tall. **Stem** pleioanthic, condensed when young, later more-or-less creeping-ascending. **Leaves** to ca 8 together; petiole terete, sometimes slightly D-shaped towards the base of leaf laminae, 17-33 cm long, always tinged reddish towards the base, densely scabrid or sometimes glabrous, drying rust-brown, sheathing only at the extreme base, the sheath extended into a bicarinate narrowly lanceolate free ligular portion to 15 cm long, this drying dark brown; laminae elliptic to obovate, sometimes oblong, 20-24 cm long x 7-13 cm wide, dark green and glossy adaxially, abaxially paler and glaucous, base always decurrent, tip acute and acuminate for up to ca 2 cm; midrib raised abaxially (dry), sometimes densely scabrid, adaxially flush with the lamina, 2-5 mm wide, with 15-19 primary lateral veins on each side, these irregularly alternating with interprimary veins and diverging at 60°-70°; secondary venation prominent, sometimes discontinuous, arising from the midrib and from the bases of the primary veins; tertiary venation often tessellate but sometimes obscure. **Inflorescences** 1-4, pendant, together subtended by lanceolate prophyll resembling the ligular leaf sheaths; peduncle to ca 8.5 cm long, not exceeding the prophyll. **Spathe** 7-13 cm long, lower spathe, obliquely inserted from peduncle, straight, 2.5-4 cm long, thickly coriaceous, green, differentiated from the limb by a weak constriction level with the base of the interstice; limb 4.5-9 cm long, becoming white, caducous, oblongo-lanceolate, with a tubular mucro up to 1.2 cm long. **Spadix** 5.5-10 cm long, subcylindric; female zone 2-2.8 cm long, $\frac{1}{3}$ of spadix length, adnate to the spathe in the lower $\frac{2}{3}$, widest at side, narrowest at ventral and dorsal, the free part slightly cylindrical; pistils numerous and crowded, subcylindric, ca 0.7 mm diam. x 1.2 mm long;



Plate 2. *Schismatoglottis confinis* Wong S.Y. & P.C.Boyce. A. Overall habitat; B. Leaf lamina with decurrent base; C. Leaf abaxial surface glaucous; D. Pinkish red innovations with dark red to deep purple petioles; E. Emerging inflorescence.

stigma sessile, about the diameter to slightly wider than the ovary, button-like, papillate, staining light brown in alcohol; interpistillar staminodes, less than five, small, ca 0.4 mm diam., slightly taller than pistils, staminodes or pistillodes (?) confined to a single row along the spathe/spadix adnation, about the height and diameter of the pistils, remaining white in alcohol, subcylindric, flat-topped; sterile interstice 2.5 mm long, somewhat obconoid, distally 6 mm diam., with pistillodes basally and staminodes distally, pistillodes of equal size and height to pistils, white but staining brown in alcohol, staminodes of interstice crowded, irregularly polygonal, flat-topped 0.5-1 mm diam., remaining white in alcohol; male zone 2.5-5 cm long, $\frac{1}{2}$ of spadix length, rectangular, basally isodiametric with top of interstice, tapering to a blunt point in the upper half, staining brown in alcohol; stamens crowded, truncate, flat-topped, somewhat irregularly rectangular with the connective wide, flat, 0.6 mm across x 1.4 mm long, the pores small, oblong, deep, on the inner surface of stamens, ca 0.3 mm across; appendix absent. **Infructescence** not observed.

Other specimens seen: SARAWAK: Kuching Division, Padawan, Kampung Sadir, 2 Feb 2006, *Simon Kutuh ak Paru AR-1695* (SAR); Padawan, Kampung Sadir, Simpang Banyak, 1 May 2005, *Simon Kutuh ak Paru AR-1816* (SAR); Samarahan Division: Serian, Gunung Ampungan, $01^{\circ} 09' 08.2''$; $110^{\circ} 37' 21.2''$, 21 Nov 2003, *P.C.Boyce & Jeland ak Kisai AR-146.2* (SAR spirit only); Serian, Gunung Ampungan, $01^{\circ} 09' 10.1''$; $110^{\circ} 37' 26.2''$, 28 Aug 2006, *P.C.Boyce & S.Y.Wong AR-2004* (SAR); Serian, Pichin, Tubih, Tahang Sipukam, $01^{\circ} 07' 16.6''$; $110^{\circ} 26' 51.2''$, 26 Jul 2005, *P.C.Boyce et al. AR-1305* (SAR); Ibid., 26 Jul 2005, *P.C.Boyce et al. AR-1307* (SAR); Serian, Mongkos, Kampung Batuh, Gunung Selabur, $00^{\circ} 57' 26.2''$; $110^{\circ} 30' 15.8''$, 15 Mar 2006, *P.C.Boyce et al. AR-1732* (SAR); Serian, Pichin, Sungai Bombo, 25 Nov 2004, *Simon Kutuh ak Paru AR-761* (SAR).

Distribution: West Sarawak, Kuching & Samarahan Divisions, endemic to the Padawan/Serian areas.

Habitat: Always terrestrial mostly under full shade in deep soil on limestones and sandstones, sometimes not in full shade. 250-568 m asl.

Notes: *Schismatoglottis confinis* appears to be closely allied to *S. bauensis* but can be distinguished by the leaf abaxial surface, which is glaucous in *S. confinis* but not in *S. bauensis*. The leaf base is always decurrent in *S. confinis* but obtuse to slightly decurrent in *S. bauensis*, while secondary venation is

prominent in *S. confinis* but obscure in *S. bauensis*. The tertiary venation of *S. confinis* is often tessellate. *Schismatoglottis confinis* has pores that are oblong (ca 0.3 mm), deep and located on the inner surface of stamens as compared punctiform pores (ca 0.15 mm) with protruding tissue from innermost surface and located at the edges of stamens in *S. bauensis*. The anther connective is flat in *S. confinis* but elevated in *S. bauensis* while the male zone of *S. confinis* stains brown in alcohol but remains white basally and stains brown distally in *S. bauensis*.

Although *S. confinis* can be found on limestones it always occurs terrestrially in deep soil as compared to *S. bauensis* which occurs lithophytically in humus and litter pockets on limestone boulders and cliffs. *Schismatoglottis confinis* can be found as well on the sandstones of Gunung Ampungan; the distance between this locality and Padawan/Serian limestones is only ca 30 km. Additionally, based on known collections, *S. confinis* occurs at much higher altitudes (near to 600 m asl) as compared to *S. bauensis* which occurs at most at 100 m asl.

Schismatoglottis confinis and *S. bauensis* are most similar to *Schismatoglottis monoplacenta* M. Hotta but differ among other characters by lacking a spadix appendix. *Schismatoglottis bauensis* and *S. monoplacenta* share a similar habitat; both occur lithophytically on vertical limestone.

Etymology: The specific epithet is derived from the Greek *confinis*, meaning adjacent or adjoining, in allusion to the morphological similarity (and we speculate phylogenetic closeness) of *S. confinis* to *S. bauensis*.

Key to the species

Schismatoglottis confinis can be fitted into the key to Bornean *Schismatoglottis* (Hay & Yuzammi 2000) as follows:

- 11a. Male zone subcylindric; pollen sacs opening through a common pore in each theca 12
- 11b. Male zone clavate to ellipsoid; pollen sacs opening through paired pores in each theca 13

- 12a. Leaf lamina abaxially not glaucous, base obtuse to slightly decurrent, secondary and tertiary venation obscure; pore at edge of stamen, punctiform (ca 0.15 mm) with protruding tissue from innermost surface, connective elevated, male zone remained white basally and stained brown distally in alcohol. Lithophytic on limestones, Bau, Kuching

- Division *S. bauensis*
- 12b. Leaf lamina abaxially glaucous, leaf base always decurrent, secondary venation prominent, tertiary venation sometimes pronouncedly tessellate; pore at inner surface of stamen, oblong (ca 0.3 mm), connective flat, male zone completely stained brown in alcohol. Terrestrial in deep soil on limestones and sandstones, Padawan, Kuching Division and Serian, Samarahan Division *S. confinis*
- 13a in key = 14a, etc.

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